

U.S. Application No. 10/538,860
Attorney Docket No. 2003B133C
Supplemental Response to OA of December 14, 2006
Response Dated February 12, 2007

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List of Claims:

1. (Currently Amended) A copolymer comprising an isoolefin and a multiolefin, the copolymer having a copolymer sequence distribution defined by the following equation:

$$F = m A / (1 + mA)^2$$

wherein m is the copolymer sequence distribution parameter; A is the molar ratio of multiolefin to isoolefin in the copolymer; [[and]] F is the isoolefin-multiolefin-multiolefin triad fraction in the copolymer; wherein m is from greater than 1.5; and wherein m is determined by solving said equation.

2. (Original) The copolymer of claim 1, wherein m is from greater than 2.0.
3. (Original) The copolymer of claim 1, wherein m is from greater than 2.5.
4. (Original) The copolymer of claim 1, wherein m is from greater than 3.5.
5. (Previously presented) The copolymer of claim 1, wherein the multiolefin is a conjugated diene.
6. (Previously presented) The copolymer of claim 1, wherein the multiolefin content is from greater than 0.5 mol%.
7. (Previously presented) The copolymer of claim 1, wherein the multiolefin content is from greater than 1.0 mol%.
8. (Previously presented) The copolymer of claim 1, wherein the multiolefin content is from greater than 2.5 mol%.
9. (Previously presented) The copolymer of claim 1, wherein the multiolefin content is from greater than 5.0 mol%.
10. (Currently Amended) A copolymer comprising isobutylene and isoprene, the copolymer having a copolymer sequence distribution defined by the following equation:

$$F = m A / (1 + mA)^2$$

wherein m is the copolymer sequence distribution parameter; A is the molar ratio of isoprene to isobutylene in the copolymer; [[and]] F is the isobutylene-isoprene-isoprene triad fraction in the copolymer; wherein m is from greater than 1.5; and wherein m is determined by solving said equation.

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11. (Original) The copolymer of claim 10, wherein m is from greater than 2.0.
12. (Original) The copolymer of claim 10, wherein m is from greater than 2.5.
13. (Original) The copolymer of claim 10, wherein m is from greater than 3.5.
14. (Previously presented) The copolymer of claim 10, wherein the isoprene content is from greater than 0.5 mol%.
15. (Previously presented) The copolymer of claim 10, wherein the isoprene content is from greater than 1.0 mol%.
16. (Previously presented) The copolymer of claim 10, wherein the isoprene content is from greater than 2.5 mol%.
17. (Previously presented) The copolymer of claim 10, wherein the isoprene content is from greater than 5.0 mol%.
18. (Currently Amended) A copolymer comprising an isoolefin and a multiolefin, the copolymer having a copolymer sequence distribution defined by the following equation:

$$F = m A / (1 + mA)^2$$

wherein m is the copolymer sequence distribution parameter; A is the molar ratio of multiolefin to isoolefin in the copolymer; [[and]] F is the isoolefin-multiolefin-multiolefin triad fraction in the copolymer; wherein m is from 1.10 to 1.25; and wherein m is determined by solving said equation.

19. (Original) The copolymer of claim 18, wherein m is from 1.15 to 1.20.
20. (Original) The copolymer of claim 18, wherein m is from 1.15 to 1.25.
21. (Original) The copolymer of claim 18, wherein m is about 1.20.
22. (Previously presented) The copolymer of claim 18, wherein the multiolefin is a conjugated diene.
23. (Previously presented) The copolymer of claim 18, wherein the multiolefin content is from greater than 0.5 mol%.
24. (Previously presented) The copolymer of claim 18, wherein the multiolefin content is from greater than 1.0 mol%.
25. (Previously presented) The copolymer of claim 18, wherein the multiolefin content is from greater than 2.5 mol%.

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1,1,1,2-tetrafluoropropane; 1,1,1,3-tetrafluoropropane; 1,1,2,2-tetrafluoropropane;
 1,1,2,3-tetrafluoropropane; 1,1,3,3-tetrafluoropropane; 1,2,2,3-tetrafluoropropane;
 1,1,1,2,2-pentafluoropropane; 1,1,1,2,3-pentafluoropropane; 1,1,1,3,3-
 pentafluoropropane; 1,1,2,2,3-pentafluoropropane; 1,1,2,3,3-pentafluoropropane;
 1,1,1,2,2,3-hexafluoropropane; 1,1,1,2,3,3-hexafluoropropane; 1,1,1,3,3,3-
 hexafluoropropane; 1,1,1,2,2,3,3-heptafluoropropane; 1,1,1,2,3,3,3-heptafluoropropane;
 1-fluorobutane; 2-fluorobutane; 1,1-difluorobutane; 1,2-difluorobutane; 1,3-
 difluorobutane; 1,4-difluorobutane; 2,2-difluorobutane; 2,3-difluorobutane; 1,1,1-
 trifluorobutane; 1,1,2-trifluorobutane; 1,1,3-trifluorobutane; 1,1,4-trifluorobutane; 1,2,2-
 trifluorobutane; 1,2,3-trifluorobutane; 1,3,3-trifluorobutane; 2,2,3-trifluorobutane;
 1,1,1,2-tetrafluorobutane; 1,1,1,3-tetrafluorobutane; 1,1,1,4-tetrafluorobutane; 1,1,2,2-
 tetrafluorobutane; 1,1,2,3-tetrafluorobutane; 1,1,2,4-tetrafluorobutane; 1,1,3,3-
 tetrafluorobutane; 1,1,3,4-tetrafluorobutane; 1,1,4,4-tetrafluorobutane; 1,2,2,3-
 tetrafluorobutane; 1,2,2,4-tetrafluorobutane; 1,2,3,3-tetrafluorobutane; 1,2,3,4-
 tetrafluorobutane; 2,2,3,3-tetrafluorobutane; 1,1,1,2,2-pentafluorobutane; 1,1,1,2,3-
 pentafluorobutane; 1,1,1,2,4-pentafluorobutane; 1,1,1,3,3-pentafluorobutane; 1,1,1,3,4-
 pentafluorobutane; 1,1,1,4,4-pentafluorobutane; 1,1,2,2,3-pentafluorobutane; 1,1,2,2,4-
 pentafluorobutane; 1,1,2,3,3-pentafluorobutane; 1,1,2,4,4-pentafluorobutane; 1,1,3,3,4-
 pentafluorobutane; 1,2,2,3,3-pentafluorobutane; 1,2,2,3,4-pentafluorobutane; 1,1,1,2,2,3-
 hexafluorobutane; 1,1,1,2,2,4-hexafluorobutane; 1,1,1,2,3,3-hexafluorobutane;
 1,1,1,2,3,4-hexafluorobutane; 1,1,1,2,4,4-hexafluorobutane; 1,1,1,3,3,4-hexafluorobutane;
 1,1,1,3,4,4-hexafluorobutane; 1,1,1,4,4,4-hexafluorobutane; 1,1,2,2,3,3-hexafluorobutane;
 1,1,2,2,3,4-hexafluorobutane; 1,1,2,2,4,4-hexafluorobutane; 1,1,2,3,3,4-hexafluorobutane;
 1,1,2,3,4,4-hexafluorobutane; 1,2,2,3,3,4-hexafluorobutane; 1,1,1,2,2,3,3-
 heptafluorobutane; 1,1,1,2,2,4,4-heptafluorobutane; 1,1,1,2,2,3,4-heptafluorobutane;
 1,1,1,2,3,3,4-heptafluorobutane; 1,1,1,2,3,4,4-heptafluorobutane; 1,1,1,2,4,4,4-
 heptafluorobutane; 1,1,1,3,3,4,4-heptafluorobutane; 1,1,1,2,2,3,3,4-octafluorobutane;
 1,1,1,2,2,3,4,4-octafluorobutane; 1,1,1,2,3,3,4,4-octafluorobutane; 1,1,1,2,2,4,4,4-
 octafluorobutane; 1,1,1,2,3,4,4,4-octafluorobutane; 1,1,1,2,2,3,3,4,4-nonafluorobutane;
 1,1,1,2,2,3,4,4,4-nonafluorobutane; 1-fluoro-2-methylpropane; 1,1-difluoro-2-
 methylpropane; 1,3-difluoro-2-methylpropane; 1,1,1-trifluoro-2-methylpropane; 1,1,3-
 trifluoro-2-methylpropane; 1,3-difluoro-2-(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-
 methylpropane; 1,1,3,3-tetrafluoro-2-methylpropane; 1,1,3-trifluoro-2-

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(fluoromethyl)propane; 1,1,1,3,3-pentafluoro-2-methylpropane; 1,1,3,3-tetrafluoro-2-(fluoromethyl)propane; fluorocyclobutane; 1,1-difluorocyclobutane; 1,2-difluorocyclobutane; 1,3-difluorocyclobutane; 1,1,2-trifluorocyclobutane; 1,1,3-trifluorocyclobutane; 1,2,3-trifluorocyclobutane; 1,1,2,2-tetrafluorocyclobutane; 1,1,3,3-tetrafluorocyclobutane; 1,1,2,2,3-pentafluorocyclobutane; 1,1,2,3,3-pentafluorocyclobutane; 1,1,2,2,3,3-hexafluorocyclobutane; 1,1,2,2,3,4-hexafluorocyclobutane; 1,1,2,3,3,4-hexafluorocyclobutane; 1,1,2,2,3,3,4-heptafluorocyclobutane; vinyl fluoride; 1,1-difluoroethene; 1,2-difluoroethene; 1,1,2-trifluoroethene; 1-fluoropropene, 1,1-difluoropropene; 1,2-difluoropropene; 1,3-difluoropropene; 2,3-difluoropropene; 3,3-difluoropropene; 1,1,2-trifluoropropene; 1,1,3-trifluoropropene; 1,2,3-trifluoropropene; 1,3,3-trifluoropropene; 2,3,3-trifluoropropene; 3,3,3-trifluoropropene; 1-fluoro-1-butene; 2-fluoro-1-butene; 3-fluoro-1-butene; 4-fluoro-1-butene; 1,1-difluoro-1-butene; 1,2-difluoro-1-butene; 1,3-difluoropropene; 1,4-difluoro-1-butene; 2,3-difluoro-1-butene; 2,4-difluoro-1-butene; 3,3-difluoro-1-butene; 3,4-difluoro-1-butene; 4,4-difluoro-1-butene; 1,1,2-trifluoro-1-butene; 1,1,3-trifluoro-1-butene; 1,1,4-trifluoro-1-butene; 1,2,3-trifluoro-1-butene; 1,2,4-trifluoro-1-butene; 1,3,3-trifluoro-1-butene; 1,3,4-trifluoro-1-butene; 1,4,4-trifluoro-1-butene; 2,3,3-trifluoro-1-butene; 2,3,4-trifluoro-1-butene; 2,4,4-trifluoro-1-butene; 3,3,4-trifluoro-1-butene; 3,4,4-trifluoro-1-butene; 4,4,4-trifluoro-1-butene; 1,1,2,3-tetrafluoro-1-butene; 1,1,2,4-tetrafluoro-1-butene; 1,1,3,3-tetrafluoro-1-butene; 1,1,3,4-tetrafluoro-1-butene; 1,1,4,4-tetrafluoro-1-butene; 1,2,3,3-tetrafluoro-1-butene; 1,2,3,4-tetrafluoro-1-butene; 1,2,4,4-tetrafluoro-1-butene; 1,3,3,4-tetrafluoro-1-butene; 1,3,4,4-tetrafluoro-1-butene; 1,4,4,4-tetrafluoro-1-butene; 2,3,3,4-tetrafluoro-1-butene; 2,3,4,4-tetrafluoro-1-butene; 2,4,4,4-tetrafluoro-1-butene; 3,3,4,4-tetrafluoro-1-butene; 3,4,4,4-tetrafluoro-1-butene; 1,1,2,3,3-pentafluoro-1-butene; 1,1,2,3,4-pentafluoro-1-butene; 1,1,2,4,4-pentafluoro-1-butene; 1,1,3,3,4-pentafluoro-1-butene; 1,1,3,4,4-pentafluoro-1-butene; 1,1,4,4,4-pentafluoro-1-butene; 1,2,3,3,4-pentafluoro-1-butene; 1,2,3,4,4-pentafluoro-1-butene; 1,2,4,4,4-pentafluoro-1-butene; 2,3,3,4,4-pentafluoro-1-butene; 2,3,4,4,4-pentafluoro-1-butene; 3,3,4,4,4-pentafluoro-1-butene; 1,1,2,3,3,4-hexafluoro-1-butene; 1,1,2,3,4,4-hexafluoro-1-butene; 1,1,2,4,4,4-hexafluoro-1-butene; 1,2,3,3,4,4-hexafluoro-1-butene; 1,2,3,4,4,4-hexafluoro-1-butene; 2,3,3,4,4,4-hexafluoro-1-butene; 1,1,2,3,3,4,4-heptafluoro-1-butene; 1,1,2,3,4,4,4-heptafluoro-1-butene; 1,2,3,3,4,4,4-heptafluoro-1-butene; 1-fluoro-2-butene; 2-fluoro-2-butene; 1,1-difluoro-2-butene; 1,2-

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difluoro-2-butene; 1,3-difluoro-2-butene; 1,4-difluoro-2-butene; 2,3-difluoro-2-butene; 1,1,1-trifluoro-2-butene; 1,1,2-trifluoro-2-butene; 1,1,3-trifluoro-2-butene; 1,1,4-trifluoro-2-butene; 1,2,3-trifluoro-2-butene; 1,2,4-trifluoro-2-butene; 1,1,1,2-tetrafluoro-2-butene; 1,1,1,3-tetrafluoro-2-butene; 1,1,1,4-tetrafluoro-2-butene; 1,1,2,3-tetrafluoro-2-butene; 1,1,2,4-tetrafluoro-2-butene; 1,2,3,4-tetrafluoro-2-butene; 1,1,1,2,3-pentafluoro-2-butene; 1,1,1,2,4-pentafluoro-2-butene; 1,1,1,3,4-pentafluoro-2-butene; 1,1,1,4,4-pentafluoro-2-butene; 1,1,2,3,4-pentafluoro-2-butene; 1,1,2,4,4-pentafluoro-2-butene; 1,1,1,2,3,4-hexafluoro-2-butene; 1,1,1,2,4,4-hexafluoro-2-butene; 1,1,1,3,4,4-hexafluoro-2-butene; 1,1,1,4,4,4-hexafluoro-2-butene; 1,1,2,3,4,4-hexafluoro-2-butene; 1,1,1,2,3,4,4-heptafluoro-2-butene; 1,1,1,2,4,4,4-heptafluoro-2-butene; and mixtures thereof.

52. (Original) The copolymer of claim 35, wherein the one or more hydrofluorocarbon(s) is independently selected from the group consisting of fluoromethane, difluoromethane, trifluoromethane, 1,1-difluoroethane, 1,1,1-trifluoroethane, 1,1,1,2-tetrafluoroethane, and mixtures thereof.
53. (Original) The copolymer of claim 35, wherein the diluent comprises from 15 to 100 volume % HFC based upon the total volume of the diluent.
54. (Original) The copolymer of claim 35, wherein the diluent comprises from 20 to 100 volume % HFC based upon the total volume of the diluent.
55. (Original) The copolymer of claim 35, wherein the diluent comprises from 25 to 100 volume % HFC based upon the total volume of the diluent.
56. (Original) The copolymer of claim 35, wherein the diluent further comprises a hydrocarbon, a non-reactive olefin, and/or an inert gas.
57. (Original) The copolymer of claim 56, wherein the hydrocarbon is a halogenated hydrocarbon other than an HFC.
58. (Original) The copolymer of claim 57, wherein the halogenated hydrocarbon is methyl chloride.
59. (Original) The copolymer of claim 35, wherein the one or more Lewis acid(s) is represented by the formula MX_4 ;
 wherein M is a Group 4, 5, or 14 metal; and
 each X is a halogen.

PAGE 13/68 * RCVD AT 2/12/2007 5:23:31 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-2/18 * DNIS:2738300 * CSID:281 834 1231 * DURATION (mm:ss):20:40

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each $RC=OO$ is a monovalent hydrocarbacyl radical independently selected from the group independently selected from the C_2 to C_{30} group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each R' is a monovalent C_1 to C_{12} hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

n is an integer from 0 to 3;

m is a integer from 0 to 3, wherein the sum of n and m is from 1 to 3; and

each X is a halogen.

68. (Original) The copolymer of claim 35, wherein the one or more Lewis acid(s) is represented by the formula MX_y ;

wherein M is a Group 15 metal;

each X is a halogen; and

y is 3, 4 or 5.

69. (Original) The copolymer of claim 35, wherein the one or more Lewis acid(s) is represented by the formula MR_nX_{y-n} ;

wherein M is a Group 15 metal;

each R is a monovalent C_1 to C_{12} hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

n is an integer from 0 to 4;

y is 3, 4 or 5, wherein n is less than y ; and

each X is a halogen.

70. (Original) The copolymer of claim 35, wherein the one or more Lewis acid(s) is represented by the formula $M(RO)_nR'_mX_{y-(m+n)}$;

wherein M is a Group 15 metal,

each RO is a monovalent C_1 to C_{30} hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;

each R' is a monovalent C_1 to C_{12} hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

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n is an integer from 0 to 4;

m is an integer from 0 to 4;

y is 3, 4 or 5, wherein the sum of n and m is less than y ; and

each X is a halogen.

71. (Original) The copolymer of claim 35, wherein the one or more Lewis acid(s) is represented by the formula $M(RC=OO)_nR'_mX_{y-(m+n)}$;

wherein M is a Group 15 metal;

each $RC=OO$ is a monovalent C_2 to C_{30} hydrocarbacyloxy radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each R' is a monovalent C_1 to C_{12} hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

n is an integer from 0 to 4;

m is an integer from 0 to 4;

y is 3, 4 or 5, wherein the sum of n and m is less than y ; and

each X is a halogen.

72. (Original) The copolymer of claim 35, wherein the one or more Lewis acid(s) is independently selected from the group consisting of titanium tetrachloride, titanium tetrabromide, vanadium tetrachloride, tin tetrachloride, zirconium tetrachloride, titanium bromide trichloride, titanium dibromide dichloride, vanadium bromide trichloride, tin chloride trifluoride, benzyltitanium trichloride, dibenzyltitanium dichloride, benzylzirconium trichloride, dibenzylzirconium dibromide, methyltitanium trichloride, dimethyltitanium difluoride, dimethyltin dichloride, phenylvanadium trichloride, methoxytitanium trichloride, *n*-butoxytitanium trichloride, di(isopropoxy)titanium dichloride, phenoxytitanium tribromide, phenylmethoxyzirconium trifluoride, methyl methoxytitanium dichloride, methyl methoxytin dichloride, benzyl isopropoxyvanadium dichloride, acetoxytitanium trichloride, benzoylzirconium tribromide, benzoyloxytitanium trifluoride, isopropoyloxytin trichloride, methyl acetoxytitanium dichloride, benzyl benzoyloxyvanadium chloride, vanadium oxytrichloride, aluminum trichloride, boron trifluoride, gallium trichloride, indium trifluoride, ethylaluminum dichloride,

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benzoic acid, 1-chloroacetic acid, dichloroacetic acid, trichloroacetic acid, trifluoroacetic acid, p-chlorobenzoic acid, p-fluorobenzoic acid, acetyl chloride, acetyl bromide, cinnamyl chloride, benzoyl chloride, benzoyl bromide, trichloroacetylchloride, trifluoroacetylchloride, p-fluorobenzoylchloride, methanesulfonic acid, trifluoromethanesulfonic acid, trichloromethanesulfonic acid, p-toluenesulfonic acid, methanesulfonyl chloride, methanesulfonyl bromide, trichloromethanesulfonyl chloride, trifluoromethanesulfonyl chloride, p-toluenesulfonyl chloride, methanol, ethanol, propanol, 2-propanol, 2-methylpropan-2-ol, cyclohexanol, benzyl alcohol, phenol, 2-methylphenol, 2,6-dimethylphenol, p-chlorophenol, p-fluorophenol, 2,3,4,5,6-pentafluorophenol, and 2-hydroxynaphthalene.

78. (Original) The copolymer of claim 35, wherein the one or more initiator(s) is independently selected from the group consisting of 2-chloro-2,4,4-trimethylpentane; 2-bromo-2,4,4-trimethylpentane; 2-chloro-2-methylpropane; 2-bromo-2-methylpropane; 2-chloro-2,4,4,6,6-pentamethylheptane; 2-bromo-2,4,4,6,6-pentamethylheptane; 1-chloro-1-methylethylbenzene; 1-chloroadamantane; 1-chloroethylbenzene; 1, 4-bis(1-chloro-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-chloro-1-methylethyl) benzene; 2-acetoxy-2,4,4-trimethylpentane; 2-benzoyloxy-2,4,4-trimethylpentane; 2-acetoxy-2-methylpropane; 2-benzoyloxy-2-methylpropane; 2-acetoxy-2,4,4,6,6-pentamethylheptane; 2-benzoyl-2,4,4,6,6-pentamethylheptane; 1-acetoxy-1-methylethylbenzene; 1-acetoxadamantane; 1-benzoyloxyethylbenzene; 1,4-bis(1-acetoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-acetoxy-1-methylethyl) benzene; 2-methoxy-2,4,4-trimethylpentane; 2-isopropoxy-2,4,4-trimethylpentane; 2-methoxy-2-methylpropane; 2-benzoyloxy-2-methylpropane; 2-methoxy-2,4,4,6,6-pentamethylheptane; 2-isopropoxy-2,4,4,6,6-pentamethylheptane; 1-methoxy-1-methylethylbenzene; 1-methoxyadamantane; 1-methoxyethylbenzene; 1,4-bis(1-methoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-methoxy-1-methylethyl) benzene, and 1,3,5-tris(1-chloro-1-methylethyl) benzene.
79. (Original) The copolymer of claim 35, wherein the one or more initiator(s) further comprise a weakly-coordinating anion.
80. (Original) The copolymer of claim 35, wherein the one or more initiator(s) comprise greater than 30 ppm water (based upon weight).

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81. (Original) The copolymer of claim 35, wherein the contacting further comprises contacting one or more monomer(s) independently selected from the group consisting of olefins, alpha-olefins, disubstituted olefins, isoolefins, conjugated dienes, non-conjugated dienes, styrenics, substituted styrenics, and vinyl ethers.
82. (Original) The copolymer of claim 35, wherein the contacting further comprises contacting one or more monomer(s) independently selected from the group consisting of styrene, para-alkylstyrene, para-methylstyrene, alpha-methyl styrene, divinylbenzene, diisopropenylbenzene, isobutylene, 2-methyl-1-butene, 3-methyl-1-butene, 2-methyl-2-pentene, isoprene, butadiene, 2,3-dimethyl-1,3-butadiene, β -pinene, myrcene, 6,6-dimethyl-fulvene, hexadiene, cyclopentadiene, methyl cyclopentadiene, piperylene, methyl vinyl ether, ethyl vinyl ether, and isobutyl vinyl ether.
83. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer is halogenated to form a halogenated copolymer.
84. (Cancelled)
85. (Cancelled)
86. (Cancelled)
87. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a Mw of from greater than 50,000.
88. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a Mw of from greater than 100,000.
89. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a Mw of from greater than 500,000.
90. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a Mw of from greater than 1,000,000.
91. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a MWD of from greater than 2.
92. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a MWD of from 2 to 6.

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93. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a Mooney viscosity of at least 20 ± 5 (ML 1 + 8 at 125°C, ASTM D 1646).
94. (Previously presented) The copolymer of any one of claims 1, 10, 18, 27, or 35, wherein the copolymer has a Mooney viscosity of from 20 ± 5 to 60 ± 5 (ML 1 + 8 at 125°C, ASTM D 1646).
95. (Previously presented) A blend comprising the copolymer of any one of claims 1, 10, 18, 27, or 35 and a secondary rubber independently selected from the group consisting of at least one of natural rubber, polyisoprene rubber, poly(styrene-co-butadiene) rubber (SBR), polybutadiene rubber (BR), poly(isoprene-co-butadiene) rubber (IBR), styrene-isoprene-butadiene rubber (STBR), ethylene-propylene rubber (EPR), ethylene-propylene-diene rubber (EPDM), polysulfide, isobutylene/cyclopentadiene copolymer rubber, isobutylene/methyl cyclopentadiene copolymer rubber, nitrile rubber, propylene oxide polymers, star-branched butyl rubber and halogenated star-branched butyl rubber, brominated butyl rubber, chlorinated butyl rubber, star-branched polyisobutylene rubber, star-branched brominated butyl (polyisobutylene/isoprene copolymer) rubber; poly(isobutylene-co-p-methylstyrene) and halogenated poly(isobutylene-co-p-methylstyrene), halogenated poly(isobutylene-co-isoprene-co-p-methylstyrene), poly(isobutylene-co-isoprene-co-styrene), halogenated poly(isobutylene-co-isoprene-co-styrene), poly(isobutylene-co-isoprene-co- α -methylstyrene) halogenated poly(isobutylene-co-isoprene-co- α -methylstyrene), and mixtures thereof.